Insulator (Heat and Frost)

2000

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Occupational Analyses Series

Insulator (Heat and Frost)

2000

Interprovincial Partnerships and Occupational Information Division

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Insulator (Heat and Frost)

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The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this occupational analysis as the national standard for the occupation of insulator (heat and frost).

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OTHER RELATED OCCUPATIONAL TITLES

This analysis covers tasks performed by an insulator whose occupational title has been identified by some provinces and territories of Canada under the following names:

- Heat and Frost Insulator
- Insulator

LIST OF PUBLISHED OCCUPATIONAL ANALYSES*

TITLE	NOC** Code
Appliance Service Technician (1997)	7332
Aquaculture Technician (1977)	2221
Arts Administrator (1989)	0114
Automotive Painter (1995)	7322
Automotive Service Technician (1998)	7321
Automotive Technician - Automatic Transmission (1990)	7321
Automotive Technician - Electrical/Electronics (1992)	7321
Automotive Technician - Engine Repair and Fuel Systems (1989)	7321
Automotive Technician - Front-End (1989)	7321
Automotive Technician - Manual Transmission, Driveline and Brakes (1990)	7321
Aviation Machinist (1994)	7231
Baker (1997)	6252
Blaster (Surface) (1987)	7372
Boilermaker (1994)	7262
Bricklayer (2000)	7281
Cabinetmaker (2000)	7272
Carpenter (1998)	7271
Cement Finisher (1995)	7282
Construction Electrician (1994)	7241
Cook (1997)	6242
Electrical Rewind Mechanic (1999)	7333
Electronics Technician - Consumer Products (1997)	2242
Electronics Technician Vol. I (1986) (Video Equipment)	2242
Electronics Technician Vol. II (1986) (Audio Equipment)	2242

* **Red Seal analyses are indicated in bold**

** **National Occupational Classification**

Electronics Technician Vol. III (1986) (Computer Equipment)	2242
Electronics Technician Vol. IV (1986) (Office Equipment)	2242
Electronics Technician Vol. VI (1986) (Communication Equipment)	2242
Electronics Technician Vol. VII (1986) (Signaling Equipment)	2242
Electronics Technician Vol. VIII (1986) (Navigation Equipment)	2242
Electronics Technician Vol. IX (1986) (Video Game Equipment)	2242
Electronics Technician Vol. X (1987) (CADD Equipment)	2242
Electronics Technician Vol. XI (1987) (CAM Equipment)	2242
Electronics Technician Vol. XII (1987) (Robotics Equipment)	2242
Electronics Technician Vol. XIII (1987) (Biomedical and Laboratory Equipment)	2242
Electronics Technician Vol. XIV (1987) (Industrial Process-Control Equipment)	2243
Farm Equipment Mechanic (2000)	7312
Floorcovering Installer (1997)	7295
Glazier (1994)	7292
Hairstylist (1997)	6271
Heating (Gas and Oil) Servicer - Commercial and Industrial (1978)	7331
Heavy Duty Equipment Mechanic (1998)	7312
Heavy Equipment Operator (1983)	7421
Industrial Electrician (1997)	7242
Industrial Instrument Mechanic (2000)	2243
Industrial Mechanic (Millwright) (1999)	7311
Insulator (Heat and Frost) (2000)	7293
Ironworker (Generalist) (1993)	7264
Lather (Interior Systems Mechanic) (1994)	7284

Logistics (1992)	0713
Machinist (1998)	7231
Major Electrical Appliance Repairer (1984)	7332
Mobile Crane Operator (1997)	7371
Motorcycle Mechanic (1995)	7334
Motor Vehicle Body Repairer (Metal and Paint) (1997)	7322
New Home Builder and Residential Renovation Contractor (1992)	0712
Oil Burner Mechanic (1997)	7331
Painter and Decorator (2000)	7294
Partsperson (1995)	1472
Plumber (1996)	7251
Power Engineer (1997)	7351
Powerline Technician (1996)	7244
Recreation Vehicle Mechanic (2000)	7383
Refrigeration and Air Conditioning Mechanic (1997)	7313
Roofer (1997)	7291
Sheet Metal Worker (1997)	7261
Sprinkler System Installer (1995)	7252
Steamfitter-Pipefitter (1996)	7252
Steel Fabricator (Fitter) (1994)	7263
Tool and Die Maker (1997)	7232
Truck-Trailer Repairer (1994)	7321
Truck and Transport Mechanic (2000)	7321
Welder (1996)	7265

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Human Resources Partnerships
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FOREWORD

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to co-operate with provincial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources Development Canada sponsors a program, under the guidance of the Canadian Council of Directors of Apprenticeship (CCDA), to develop a series of occupational analyses.

The Occupational Analysis Program has the following objectives:

- to identify and group the tasks performed by skilled workers in particular occupations;

- to identify those tasks that are performed by skilled workers in every province and territory;

- to develop instruments for use in the preparation of interprovincial standards "Red Seal" examinations and curricula for training leading to the certification of skilled workers;

- to facilitate the mobility, in Canada, of trainees and skilled workers;

- to supply employers and employees, and their associations, industries, training institutions and governments with analyses of the tasks performed in particular occupations.

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GUIDE TO ANALYSIS

DEVELOPMENT OF ANALYSIS

A draft analysis is developed by a knowledgeable consultant who, with the assistance of a committee of industry experts in the field, identifies all the tasks performed in the occupation.

The draft is then assigned to occupational analysts at Human Resources Development Canada for translation and then returned to the consultant for review to ensure conformity with the nationally approved format.

The consultant will then forward a copy of this analysis to provincial/territorial authorities for validation by specialists in the field. Their recommendations are assessed and incorporated into the final draft which also includes the identification of the common core tasks performed in the occupation.

The occupational analysis is published in both official languages.

STRUCTURE OF ANALYSIS

To facilitate the understanding of the nature of the occupation, the work performed is divided into the following divisions:

A. **BLOCK** - is the largest division within the analysis and reflects a distinct operation relevant to the occupation.

B. **TASK** - is the distinct activity that, combined with others, makes up the logical and necessary steps the worker is required to perform to complete a specific assignment within a "BLOCK".

C. **SUB-TASK** - is the smallest division into which it is practical to subdivide any work activity and, combined with others, fully describes all duties constituting a "TASK".

Supporting Knowledge & Abilities

The element of skill and knowledge that an individual must acquire to adequately perform the task is identified under this heading.

Trends

Any shifts or changes in technology which affects the block are identified under this heading.

Related Components

All components of a specified task being undertaken by the insulator are identified under this heading.

Tools and Equipment

All tools and equipment necessary for the insulator to complete a task are identified under this heading.

VALIDATION METHOD

At the request of the Canadian Council of Directors of Apprenticeship (CCDA), the Standardization SubCommittee developed a method for the validation of the national Red Seal occupational analyses.

A draft of the analysis is sent to all provinces/territories for validation. Each jurisdiction rates the sub-tasks and applies percentage ratings to blocks and tasks. This method for the validation of the national occupational analyses identifies common core tasks across Canada for a specific occupation. This feature facilitates the weighting of the Interprovincial Red Seal examinations.

DEFINITIONS

YES:	the sub-task is performed by workers in the occupation in a specific jurisdiction.
NO:	the sub-task is not performed by workers in the occupation in a specific jurisdiction.
BLOCK %:	the average number of questions (items), derived from the collective decision made by workers within the occupation from all areas of Canada, which will be placed on an interprovincial examination to assess each block of the analysis.
TASK %:	the average number of questions (items), derived from the collective decision made by workers within the occupation from all areas of Canada, which will be placed on an interprovincial examination to assess each task of the analysis.
NV:	Not Validated by a province/territory.
ND:	Not Designated in a province/territory.

PROVINCIAL/TERRITORIAL ABBREVIATIONS

NF:	Newfoundland and Labrador
NS:	Nova Scotia
PE:	Prince Edward Island
NB:	New Brunswick
QC:	Quebec
ON:	Ontario
MB:	Manitoba
SK:	Saskatchewan
AB:	Alberta
BC:	British Columbia
NT:	Northwest Territories
YK:	Yukon

COMMON CORE

The criteria for determining common core are dependant on the performance of sub-tasks. If 70 percent of the responding jurisdictions (excluding NVs and NDs) perform the sub-task, it shall be considered common core.

Interprovincial Red Seal examinations are based on the common core identified through this validation process. This process identifies what will be assessed through the interprovincial examination.

BLOCKS AND TASKS WEIGHTING (APPENDIX "C")

This appendix represents the block and task percentages as submitted by each jurisdiction.

Each jurisdiction, with the use of a provincial/territorial occupational advisory committee, validates the content, places percentages on blocks and tasks, and indicates whether or not the sub-tasks are performed by the skilled workers within the occupation. The results of this exercise are submitted to the consultant who then analyzes the data and develops this appendix which provides the individual jurisdictional validation results as well as the national averages of all responses.

PIE CHART (APPENDIX "D")

The graph depicts the national percentages assigned to blocks in the analysis.

SCOPE OF THE INSULATOR (HEAT AND FROST) OCCUPATION

The heat and frost insulator specializes in the installation and maintenance of insulation systems, for the conservation of energy and the control of the environment in buildings and premises requiring temperature control, heat transfer, sound barriers, fire protection and asbestos abatement.

Heat and frost insulating includes the manufacturing, fabricating, assembling, moulding, handling, erecting, spraying, pouring, mixing, hanging, preparing, applying, adjusting, altering, repairing, dismantling, reconditioning, testing, and maintaining of insulating materials and systems used in this trade.

The work of the insulator encompasses all facets of the trade, such as handling or distributing insulating materials on job premises; operating equipment and tools of the trade; applying pipe and boiler coverings; insulating hot and cold surfaces, ducts, flues, and all protective coverings required on insulation materials; erecting scaffolding; and, conducting asbestos abatement.

The following are some of the requirements for persons who work as heat and frost insulators:

- mandatory wearing of safety equipment including supplied or filtered air breathing apparatus and full-face mask in the removal of asbestos insulation;
- working in confined spaces or in areas difficult to access;
- handling of materials, such as fibreglass, cellulose, rock wool, mineral wool, mastics, foams, etc.;
- working in varying and/or extreme temperatures (cold & heat);
- working in environments where limits of exposure are monitored; and,
- working out of town and/or in isolated areas, such as northern regions.

OCCUPATIONAL OBSERVATIONS[†]

The heat and frost insulation trade is a constantly changing technology in North America. Twenty to thirty years ago, insulation was more of an afterthought on many projects; only where conditions made it absolutely necessary was insulation applied.

On high and medium temperature installations, the majority of the materials were asbestos based whereas cork was used predominantly for low temperature work or cryogenics. The finishing materials for indoor applications consisted mainly of asbestos cement coatings with canvas or asbestos cloth jacketing. The installations exposed to the elements were usually finished or protected by a reinforced mastic or a roofing felt cover. These are some of the reasons why the trade was not demanding or diversified, and did not require the in-depth knowledge as it does today.

In today's age of high technology, the changes in this trade are immense due to the increased knowledge in environmental protection, energy conservation, and safety and health hazards. Since asbestos is a totally banned product, a whole myriad of new products are now on the market. For jacketing purposes, mastics, roofing felt, asbestos cloth and, for a large part, canvas covering have been replaced. Today, heat and frost insulators use plastics, laminates, metals, such as stainless steel, aluminum, galvanized steel or coated steel for jacketing fabrication. These materials require extensive knowledge in drafting, layout and fabricating procedures. To be economically viable, one needs extensive knowledge in the make-up and behaviour of the material, as well as the development of patterns best suited for the job at hand. It is a must for today's heat and frost insulators to have a good understanding of geometric shapes and their application in the fabrication on the job site.

With the importance given to the environment, new techniques and materials are a steady occurrence in the industry, such as acoustic insulation, and there is a need to train insulators to meet the requirement. It is a prerequisite to be able to adapt to a given situation and have the ability to specialize in the required task. Upgrading and training in the use of new tools and equipment is absolutely necessary to facilitate the large variety of jacketing fabrications and insulation applications. Fire stopping and smoke seal installations are constantly being improved, and the mastering of this discipline is one of utmost importance.

In summary, not only must the heat and frost insulators be highly skilled craftspersons, they must also be willing to adapt to change, adopt new techniques and retrain when necessary. It is essential to be as well versed in the trade as possible. Wherever it is to the industry's advantage, heat and frost insulators should specialize and acquire the skills required to perform the job successfully.

[†] Extract from: Block Release Program for Heat and Frost Insulator trade - N.B.

SAFETY

Safe working procedures and conditions, accident prevention and the preservation of health are of primary importance to the industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties become aware of circumstances which may lead to injury or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to cause an accident or injury.

It is generally recognized that a safety-conscious attitude and work practices contribute to a healthy, safe and accident-free working environment.

It is imperative to apply and be familiar with the Occupational Health and Safety Act and Regulations. As well, it's essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

As safety education is an integral part of a training in all jurisdictions, personal safety practices are not recorded in this document. However, the technical safety aspect relating to each task and sub-task are included throughout this analysis.

ANALYSIS

BLOCK A

OCCUPATIONAL SKILLS

Trends: *None identified.*

Task 1 **Determines administrative requirements.**

Related Components: None identified.
Materials: Specifications, drawings.

Tools and Equipment: Scale ruler, calculator.

Sub-task

1.01 **Interprets specifications and drawings.**

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

1.01.01	knowledge of drawing symbols and abbreviations
1.01.02	knowledge of organization of drawings
1.01.03	knowledge of types of drawings
1.01.04	knowledge of health and safety regulations
1.01.05	ability to read schedules
1.01.06	ability to interpret information/specifications
1.01.07	ability to use a scale rule

Sub-task

1.02 Sets work schedules.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

1.02.01 knowledge of scope of work

1.02.02 knowledge of release dates and target dates

1.02.03 ability to organize and comply with schedule

Sub-task

1.03 Determines labour requirements.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

1.03.01 knowledge of scope of work

1.03.02 knowledge of local union agreements

1.03.03 knowledge of labour hours as per specifications

1.03.04 knowledge of available workforce

1.03.05 ability to select required qualified personnel

Sub-task

1.04 Completes documents and records as required.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

1.04.01 knowledge of site requirements

1.04.02 knowledge of required documents

Supporting Knowledge & Abilities

1.04.03	knowledge of Occupational Health and Safety Act applicable to job
1.04.04	ability to maintain up-to-date and accurate records, journals and procedures

Sub-task

1.05 Calculates required quantities of materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

1.05.01	knowledge of imperial system
1.05.02	knowledge of metric system
1.05.03	knowledge of general mathematics
1.05.04	ability to calculate area, volume and linear footage
1.05.05	ability to interpret drawings and specifications
1.05.06	ability to convert from one measurement system to another, i.e., metric, imperial

Sub-task

1.06 Orders materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

1.06.01	knowledge of types of materials required
1.06.02	knowledge of required quantities, sizes and thickness of materials

Supporting Knowledge & Abilities

1.06.03	ability to calculate required quantities of materials
1.06.04	ability to select materials according to specifications
1.06.05	ability to interpret and provide MSDS (Material Safety Data Sheets)

Task 2 **Determines production requirements.**

Related Components: Scaffolding, personal protective equipment.
Materials: Specifications, drawings, contract.

Tools and Equipment: Calculator.

Sub-task

2.01 **Determines required tools and equipment.**

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

2.01.01	knowledge of required safety equipment
2.01.02	knowledge of required personal protective equipment
2.01.03	knowledge of scope of work
2.01.04	ability to assemble and operate temporary work platform
2.01.05	ability to assess operating efficiency of safety and personal protective equipment

Sub-task

2.02 Erects scaffolding.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

2.02.01 knowledge of access and egress requirements

2.02.02 ability to assemble work platform

2.02.03 ability to assess safety of scaffolding

Sub-task

2.03 Arranges for pre-fabrication of materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

2.03.01 knowledge of required quantities, sizes and thickness of pre-fabricated materials

2.03.02 ability to take accurate measurements

2.03.03 ability to interpret material charts

2.03.04 ability to schedule material ordering

Task 3 Determines site specific requirements.

Related Components: None identified.
Materials: Specifications, drawings, contract documents.

Tools and Equipment: None identified.

Sub-task

3.01 Determines required orientation programs.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

3.01.01	knowledge of health and safety specifications
3.01.02	knowledge of on-site safety personnel
3.01.03	knowledge of client's policies and procedures
3.01.04	ability to interpret job documentation

Sub-task

3.02 Determines required safety training.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

3.02.01	knowledge of client's policies and procedures
3.02.02	knowledge of companies' policies and procedures
3.02.03	knowledge of job specifications
3.02.04	knowledge of type of equipment
3.02.05	knowledge of applicable safety regulations
3.02.06	ability to comply with all regulations, policies and procedures in the workplace

Sub-task

3.03 Determines site specific access hours and location.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

3.03.01	knowledge of pre-determined work hours
3.03.02	knowledge of collective agreement
3.03.03	ability to access information

Sub-task

3.04 Identifies required approvals.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

3.04.01	knowledge of required approvals
3.04.02	knowledge of types of approval
3.04.03	ability to access information

Sub-task

3.05 Obtains required permits.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

3.05.01	knowledge of location and placement of permits
3.05.02	knowledge of purpose of various permits
3.05.03	knowledge of content of permits
3.05.04	ability to interpret permits

Sub-task

3.06 Determines required work facilities.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

3.06.01	knowledge of required facilities for job
3.06.02	knowledge of collective agreements, labour standards legislation
3.06.03	knowledge of location of first aid stations and emergency telephone numbers
3.06.04	knowledge of emergency evacuation procedures
3.06.05	ability to make arrangements for required facilities
3.06.06	ability to read site plan

Task 4 Checks substrate for readiness.

Related Components: Piping, duct work, tanks, vessels and surfaces to be insulated. Materials: None identified.

Tools and Equipment: None identified.

Sub-task

4.01 Accesses substrate.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

4.01.01	knowledge of method of accessibility
4.01.02	knowledge of required equipment
4.01.03	knowledge of proper erection of scaffolding

Supporting Knowledge & Abilities

4.01.04	knowledge of working procedures, i.e., confined space, etc.
4.01.05	ability to develop work procedures, if required
4.01.06	ability to operate elevated work platforms
4.01.07	ability to comply with health and safety regulations
4.01.08	ability to comply with clients' policies

Sub-task

4.02 Inspects substrate.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

4.02.01	knowledge of visual inspection procedures
4.02.02	knowledge of types of substrate
4.02.03	knowledge of location of substrate
4.02.04	knowledge of types of obstructions/irregularities
4.02.05	knowledge of required remedial action
4.02.06	ability to identify and respond to irregularities and obstructions

Sub-task

4.03 Checks for release and approvals.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

4.03.01	knowledge of release procedures (authorized personnel)
4.03.02	ability to follow release procedures

Task 5 **Cleans up site after jobs.**

Related Components: None identified.
Materials: None identified.

Tools and Equipment: Brooms, vacuum cleaner, bins, shovels, scrapers, drop cloths.

Sub-task

5.01 **Disposes of materials.**

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

5.01.01	knowledge of disposal procedures
5.01.02	knowledge of required equipment
5.01.03	ability to dispose of materials according to regulations

Sub-task

5.02 **Inspects site.**

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

5.02.01	knowledge of site specific clean-up standards
5.02.02	knowledge of inspection procedures and criteria

Supporting Knowledge & Abilities

5.02.03	ability to determine when site clean-up is required
5.02.04	ability to clean up site to standard
5.02.05	ability to document clean-up

BLOCK B

INDUSTRIAL APPLICATION

Trends: *Greater need for qualified people. Need for continuous training of existing workforce. Greater increase of safety demands. Introduction of computer generated layout programs.*

Task 6 **Insulates for thermal applications.**

Related Components: Piping, boilers, tanks, vessels, duct work, breechings, chillers, precipitators, turbines, heat exchangers, pumps, fans, fittings, cold boxes.
Materials: Fiberglass, mineral wool, calcium silicate, duct wrap, foamglass, polyurethane, urethane, ceramic fibre, polystyrene, styrofoam, rubber, cork, elastromeric insulation, wire, bands, string, staples, filament tape, composite panels (i.e. Utilidor).

Tools and Equipment: Standard tool kit.

Sub-task

6.01 Insulates for hot applications. (213 to 1500 ° F)

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

6.01.01	knowledge of suitable insulation materials and finishes
6.01.02	knowledge of types of fastening systems
6.01.03	knowledge of insulation methods for anchors and guides
6.01.04	knowledge of types of anchors and guides
6.01.05	knowledge of contraction and expansion
6.01.06	ability to maintain operating temperature to prevent product solidification
6.01.07	ability to insulate for personal protection
6.01.08	ability to develop layouts

Sub-task

6.02 Insulates for moderate applications. (70 to 212° F)

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

6.02.01	knowledge of suitable insulation materials and finishes
6.02.02	knowledge of types of fastening systems
6.02.03	ability to develop layouts
6.02.04	ability to apply and install fastening systems

Sub-task

6.03 Insulates for cold applications. (30 to 69° F)

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

6.03.01	knowledge of suitable insulation materials and finishes
6.03.02	knowledge of types of fastening systems
6.03.03	knowledge of required vapour barriers
6.03.04	knowledge of required hangers and saddles
6.03.05	ability to apply and maintain vapour barriers
6.03.06	ability to develop layouts
6.03.07	ability to fabricate moulds using insulation materials
6.03.08	ability to select insulation based on properties of systems
6.03.09	ability to apply and install fastening systems

Sub-task

6.04 Insulates for low temperature applications. (-149 to -29° F)

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

6.04.01	knowledge of suitable insulation materials and finishes
6.04.02	knowledge of types of fastening systems
6.04.03	knowledge of required vapour barriers

Supporting Knowledge & Abilities

6.04.04	knowledge of required hangers and saddles
6.04.05	ability to set up for pour-in-place insulation
6.04.06	ability to develop layouts
6.04.07	ability to apply and maintain integrity of vapour barriers
6.04.08	ability to compact materials as per plans and specifications
6.04.09	ability to mix and apply or pour suitable materials
6.04.10	ability to apply and install fastening systems

Sub-task

6.05 Insulates for cryogenic systems. (-150 to -459° F)

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	no	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

6.05.01	knowledge of suitable insulation materials and finishes
6.05.02	knowledge of types of fastening systems
6.05.03	knowledge of required vapour barriers
6.05.04	knowledge of required hangers and saddles
6.05.05	knowledge of double-shell vessels
6.05.06	ability to set up for pour-in-place insulation
6.05.07	ability to develop layouts
6.05.08	ability to apply and maintain integrity of vapour barriers

Supporting Knowledge & Abilities

6.05.09	ability to compact materials as per plans and specifications
6.05.10	ability to mix and apply or pour suitable materials

Sub-task

6.06 Applies insulation over steam and electrical traced systems.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

6.06.01	knowledge of EHT (Electrical Heat Tracing) systems
6.06.02	knowledge of heat transfer cement
6.06.03	knowledge of steam tracing systems
6.06.04	knowledge of suitable materials
6.06.05	ability to select oversized material
6.06.06	ability to install oversize material
6.06.07	ability to cut fitting using oversized material
6.06.08	ability to install heat transfer cement
6.06.09	ability to read and interpret drawings and specifications

Task 7 **Fabricates insulation for tanks, vessels and fittings.**

Related Components: Tanks, vessels, equipment, fittings.
Materials: All insulating materials, sealants, adhesives, bands and seals, skewers, wire.

Tools and Equipment: Standard tool kit, band saw, mitre saw.

Sub-task

7.01 Takes required measurements.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

7.01.01 knowledge of equipment to be measured

7.01.02 knowledge of required measurements such as area and length

7.01.03 knowledge of geometry, i.e. required mathematical formula

7.01.04 ability to measure accurately

7.01.05 ability to incorporate insulation thickness into layout calculations

Sub-task

7.02 Lays out materials for fittings.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

7.02.01 knowledge of geometry and general mathematics

7.02.02 knowledge of types and function of fittings

7.02.03 ability to develop layout patterns

Supporting Knowledge & Abilities

7.02.04 ability to apply layout patterns for materials and jacketing

Sub-task

7.03 Applies adhesives or fastening systems.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

7.03.01 knowledge of types of adhesives

7.03.02 knowledge of adhesive application procedures

7.03.03 knowledge of expansion springs

7.03.04 knowledge of fastening systems

7.03.05 knowledge of installation procedures of fastening systems

7.03.06 knowledge of potential hazards of various adhesives

7.03.07 knowledge of safety procedures

7.03.08 ability to install expansion springs

7.03.09 ability to respond to the hazards of various adhesives

7.03.10 ability to select fastening systems and adhesives

Sub-task

7.04 Installs fabricated insulation fittings.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

7.04.01	knowledge of geometry and basic mathematics
7.04.02	knowledge of fastening systems
7.04.03	knowledge of required tools
7.04.04	knowledge of types of adhesives
7.04.05	ability to layout and cut mitres
7.04.06	ability to use required tools
7.04.07	ability to select and apply adhesives and fasteners

Task 8 **Fabricates removable covers.**

Related Components: Valves, pumps, vessels, instruments, flanges, turbines, manways, elbows, fittings, expansion joints, piping.
Materials: Aluminum, stainless steel, galvanized metal, silicone cloth, steel knit mesh, staples, thread, fasteners, ceramic fibres, fiberglass mat, velcro, hog rings.

Tools and Equipment: Standard tool kit, sewing machine, beader, crimper, brake, lock former, easy edger, rollers, shears, electric shears, t-square, hog ringer, pneumatic tools, stapler.

Sub-task

8.01 **Takes required measurements.**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

8.01.01	knowledge of required measurements
8.01.02	ability to use measuring tools
8.01.03	ability to take accurate measurements

Supporting Knowledge & Abilities

8.01.04 ability to incorporate insulation thickness into layout calculations

Sub-task

8.02 Develops layout.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

8.02.01 knowledge of geometry and basic mathematics

8.02.02 knowledge of specifications

8.02.03 knowledge of layout requirements

8.02.04 knowledge of fastening systems

8.02.05 knowledge of water sheds

8.02.06 knowledge of sewing procedures

8.02.07 ability to incorporate ease of removal

8.02.08 ability to draw field sketches based on applications

8.02.09 ability to incorporate jacketing materials with insulation

Sub-task

8.03 Assembles materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

8.03.01 knowledge of sequence of assembly

8.03.02 ability to use sewing equipment

8.03.03 ability to hand sew

8.03.04 ability to use assembly tools

Task 9 **Installs protective coverings.**

Related Components: Piping, boilers, tanks, vessels, duct work, breechings, chillers, precipitator, turbines, heat exchangers, pumps, fans, fittings.
Materials: Aluminum, stainless steel, mastic, fiberglass cloth, canvas, PVC jackets, pre-formed fiberglass jackets, bands, screws, caulking, seals, wheat paste, lagging adhesive, galvanized metal, rivets, PVC solvents.

Tools and Equipment: Standard tool kit, beader, crimper, lock former, easy edger, shears, forming roller, notchers, metal brake, electric shears, stud welder, electric drill, rivet gun, band tightener, roller, durodyne gun, KSM (pin) welder.

Note: Wheat paste not permitted in Ontario.

Sub-task

9.01 **Fabricates finishing materials.**

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

9.01.01	knowledge of mathematics and geometry
9.01.02	knowledge of pattern development
9.01.03	knowledge of finishing materials
9.01.04	knowledge of lap seams and safety edges
9.01.05	ability to take proper measurements for final appearance and fit
9.01.06	ability to use fabricating tools and equipment
9.01.07	ability to determine size and thickness of cladding material
9.01.08	ability to build appropriate seals
9.01.09	ability to develop water sheds

Sub-task

9.02 Installs fastening systems. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

9.02.01	knowledge of fastening systems including pin and stud welders
9.02.02	knowledge of all types of adhesives
9.02.03	ability to properly install banding and seals
9.02.04	ability to operate pin and stud welders
9.02.05	ability to apply various types of fastening systems

Task 10 Applies sealants.

Related Components: Insulation surfaces, stainless steel, aluminum, canvas, PVC jackets, glass fab.
Materials: Mastics, contact adhesives, non-contact adhesives, caulking, lagging, welding adhesives, tape sealer.

Tools and Equipment: Standard tool kit, spraying equipment, caulking gun, roller, spreader.

Sub-task

10.01 Determines application of sealants. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

10.01.01	knowledge of purpose of sealants
10.01.02	knowledge of types of sealants

Supporting Knowledge & Abilities

10.01.03	knowledge of compatibility of sealants with material
10.01.04	knowledge of climatic conditions for application
10.01.05	ability to apply sealants as per specifications

Sub-task

10.02 Installs reinforcements.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

10.02.01	knowledge of types of reinforcements
10.02.02	knowledge of required tools and equipment
10.02.03	knowledge of installation techniques

Task 11 Insulates for refractory applications. (1500 ° F +)

Related Components:	Boilers, kilns, furnaces, dryers, economizers, cookers, exchangers. Materials: Ceramic fiber, fire bricks, refractory cement, calcium silicate, diatomatious/bituminous earth.
Tools and Equipment:	Standard tool kit, specialized tools for brick work.
Note:	In some jurisdictions, brick work is performed strictly by bricklayers.

Sub-task

11.01 Selects proper insulation system (reflective, castables and cavity).

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

11.01.01	knowledge of appropriate materials
11.01.02	knowledge of location to be insulated
11.01.03	knowledge of purpose of insulation
11.01.04	knowledge of temperature
11.01.05	knowledge of types of insulation systems

Sub-task

11.02 Applies insulation materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

11.02.01	knowledge of proper application for refractory
11.02.02	knowledge of required spacing of materials
11.02.03	knowledge of cushioning blankets
11.02.04	knowledge of proper procedures for elimination of thermal shock
11.02.05	ability to build expansion joint during application
11.02.06	ability to install refractory brick work
11.02.07	ability to build and install reflective systems
11.02.08	ability to interpret building codes and specifications

Task 12 **Insulates for cryogenic applications. (-150° F to absolute zero)**

Related Components: Piping, tanks, vessels, ducts, breechings, instrumentation, fittings, double shell vessels.
Materials: Foamglass, urethane, styrofoam, perlite, tape, bands and seals, wire, sealants, filament tape, polystyrene, vapour barriers.

Tools and Equipment: Standard tool kit, blow torch.

Sub-task

12.01 Prepares substrate.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
no	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

12.01.01	knowledge of required condition of substrate
12.01.02	knowledge of hazards of extreme cold
12.01.03	ability to verify condition of substrate
12.01.04	ability to clean substrate
12.01.05	ability to dry substrate

Sub-task

12.02 Applies insulation materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
no	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

12.02.01	knowledge of complete buttering seams and joints during installation
12.02.02	knowledge of appropriate fastening systems
12.02.03	knowledge of proper installation procedures for materials
12.02.04	ability to fabricate contraction joints

Supporting Knowledge & Abilities

12.02.05	ability to incorporate contraction joints
12.02.06	ability to fabricate moulds using insulation materials
12.02.07	ability to make accurate precise cuts

Sub-task

12.03 Applies vapour barriers.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
no	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

12.03.01	knowledge of types of vapour barriers
12.03.02	knowledge of purpose and importance of vapour barriers
12.03.03	knowledge of application procedures
12.03.04	ability to apply and maintain integrity of vapour barriers

Task 13 Installs underground insulating systems.

Related Components: Piping, expansion loops.
Materials: Calcium sterate, calcium silicate, hydrocarbon granules, fiberglass, foamglass, urethane, granular, pit wrap, PVC (poly vinyl chloride) jacketing, water, mastics, poly, sealants, wire, tape, banding, seals.

Tools and Equipment: Tamper, blow torch, standard insulation tools, earth moving equipment, shovel, rake.

Sub-task

13.01 Builds forms for trenches.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

13.01.01	knowledge of condition of trench soil
13.01.02	knowledge of safe work procedures in trenches
13.01.03	knowledge of required materials
13.01.04	ability to check safety of trench
13.01.05	ability to fabricate form as per plans and specifications
13.01.06	ability to comply with safety regulations for trenches

Sub-task

13.02 Determines installation system or method.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

13.02.01	knowledge of specifications
13.02.02	knowledge of application of system
13.02.03	ability to develop expansion joints and air spacing

Sub-task

13.03 Applies insulation.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

13.03.01	knowledge of application procedures
13.03.02	knowledge of types of materials
13.03.03	knowledge of waterproof jacketing systems
13.03.04	knowledge of pour in place systems
13.03.05	ability to install and properly seal waterproof jacketing systems

Sub-task

13.04 Applies appropriate backfill.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

13.04.01	knowledge of potential contaminants
13.04.02	knowledge of types of backfill
13.04.03	ability to backfill according to specifications

Task 14 Insulates for sound proofing.

Related Components: Turbines, mufflers, ducts, piping, generators, jet engines, fans, fittings, pumps, ceilings, walls, natural gas pipelines.
Materials: Fiberglass, lead, mineral wool, Baryfol (barium impregnated foil in rubber mat), lead lined aluminum, cork, caulking, bands, seals, pins, clips, chicken wire, cement.

Tools and Equipment: Standard tool kit, beader, crimper, lock former, easy edger, shears, forming roller, notchers, metal brake, electric shears, stud welder, electric drill, rivet gun, band tightener, banding tools.

Sub-task

14.01 Insulates natural gas piping. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

14.01.01	knowledge of basics of sound transmission
14.01.02	knowledge of suitable materials
14.01.03	knowledge of effects sound proofing materials have on sound transmission
14.01.04	knowledge of potential safety hazards
14.01.05	knowledge of fastening systems
14.01.06	ability to install sound proofing materials
14.01.07	ability to install materials taking into account site/job conditions
14.01.08	ability to incorporate expansion joints
14.01.09	ability to identify need for PPE equipment i.e. sound

Sub-task

14.02 Insulates steam piping. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

14.02.01	knowledge of suitable materials
14.02.02	knowledge of potential safety hazards
14.02.03	knowledge of fastening systems
14.02.04	ability to install sound proofing materials
14.02.05	ability to incorporate expansion joints
14.02.06	ability to incorporate air spacing

Sub-task

14.03 Insulates turbine systems. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

14.03.01	knowledge of suitable materials
14.03.02	knowledge of potential safety hazards
14.03.03	knowledge of fastening systems
14.03.04	ability to install sound proofing materials
14.03.05	ability to install materials taking into account job/site conditions

Task 15 Applies fire proofing materials.

Related Components: Exhaust ducts, electrical trays, electrical conduit, hangers, structural steel refuge, areas, public access and egress.
Materials: Ceramic fibre, mineral wool, calcium silicate, fiberglass, mandolite, banding, stainless steel, cement, seals, pins, tape, washers, corner beads, wires, insulated foam glass, expanded lathe, intumescent systems.

Tools and Equipment: Standard tool kit, banding tools, stud welder, spray equipment.

Sub-task

15.01 Fireproofs kitchen exhaust ducts. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

15.01.01	knowledge of plans and specifications
15.01.02	knowledge of material specifications and applications

Supporting Knowledge & Abilities

15.01.03	ability to identify materials
15.01.04	ability to determine method of application
15.01.05	ability to prepare surface for application or installation
15.01.06	ability to prepare materials
15.01.07	ability to protect fire proofing materials

Sub-task

15.02 Fireproofs electrical trays and conduits.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

15.02.01	knowledge of plans and specifications
15.02.02	knowledge of material specifications and applications
15.02.03	ability to identify materials
15.02.04	ability to determine method of application
15.02.05	ability to prepare surface for application or installation
15.02.06	ability to prepare materials
15.02.07	ability to protect fire proofing materials
15.02.08	ability to apply fire proofing materials

Sub-task

15.03 Fireproofs structural components.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

15.03.01	knowledge of spray techniques
15.03.02	knowledge of required materials
15.03.03	knowledge of multi-layer application
15.03.04	ability to identify materials
15.03.05	ability to determine method of application
15.03.06	ability to operate spray equipment
15.03.07	ability to prepare surface
15.03.08	ability to prepare materials
15.03.09	ability to protect fire proofing materials
15.03.10	ability to use hand trowel

BLOCK C

COMMERCIAL APPLICATION

Trends: *Increase in the use of PVC and metal; increase in the use of removable pads; greater need for qualified people; a demand for shorter time frames and higher productivity expectations; increased use of pre-formed fittings; and, a decrease in the use of insulation less than 1 inch.*

Task 16 **Insulates plumbing systems.**

Related Components: Piping, tanks, pumps, fittings, hangers.
Materials: Fiberglass, elastomeric, styrofoam, urethane, staples, glue, lagging, tape, sealer, screws, contact adhesives, cement.

Tools and Equipment: Standard tool kit.

Sub-task

16.01 Insulates domestic hot water systems.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

16.01.01 knowledge of recirculating systems

16.01.02 knowledge of hot water systems

16.01.03 ability to interpret drawings and specifications

16.01.04 ability to apply appropriate insulating materials and protective coatings

16.01.05 ability to identify domestic hot water systems

Sub-task

16.02 Insulates domestic cold water systems.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

16.02.01 knowledge of cold water systems

16.02.02 knowledge of types of vapour barriers

16.02.03 knowledge of vapour barrier requirements

16.02.04 knowledge of appropriate method to insulate hangers

Supporting Knowledge & Abilities

16.02.05	ability to interpret drawings and specifications
16.02.06	ability to apply and maintain integrity of vapour barriers
16.02.07	ability to maintain integrity of insulation
16.02.08	ability to apply appropriate insulating materials and protective coatings

Sub-task

16.03 Insulates rain or storm water systems and vents.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

16.03.01	knowledge of rain and storm water systems
16.03.02	knowledge of types of vapour barriers
16.03.03	knowledge of vapour barriers
16.03.04	knowledge of insulation methods of roof hopper
16.03.05	knowledge of appropriate method to insulate hangers
16.03.06	ability to apply insulation to hangers
16.03.07	ability to insulate roof hopper
16.03.08	ability to interpret drawings and specifications

Task 17 **Insulates mechanical systems.**

Related Components: Piping, boilers, heat exchangers, breechings, mufflers, condensers, tanks, fittings, chillers, hangers, vessels, pumps.
Materials: Fiberglass, cork, foamglass, calcium silicate, styrofoam, mineral wool, urethane, elastomeric foam, polystyrene, wire, tapes, adhesives, banding, glue, seals, washers.

Tools and Equipment: Standard tool kit, stud welders, foam gun, anchors, strapping tools, drills, grinders, extension cords.

Sub-task

17.01 **Insulates steam and condensate systems.**

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

17.01.01	knowledge of operation of system
17.01.02	knowledge of drawings and specifications
17.01.03	knowledge of types of hangers, anchors and guides
17.01.04	knowledge of contraction and expansion
17.01.05	knowledge of suitable insulation materials
17.01.06	knowledge of types of fastening systems
17.01.07	knowledge of types of anchors and guides
17.01.08	knowledge of insulation methods for anchors and guides
17.01.09	ability to apply materials and cladding
17.01.10	ability to apply materials as per drawings and specifications

Sub-task

17.02 Insulates chiller and chilled water systems.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

17.02.01	knowledge of chillers
17.02.02	knowledge of types of chilled water systems
17.02.03	knowledge of suitable insulation materials
17.02.04	knowledge of operation of chillers and chilled water systems
17.02.05	knowledge of drawings and specifications
17.02.06	knowledge of types of vapour barriers
17.02.07	knowledge of vapour barriers requirements
17.02.08	knowledge of types of hangers
17.02.09	ability to apply and maintain integrity of vapour barriers
17.02.10	ability to insulate hangers
17.02.11	ability to maintain integrity of insulation
17.02.12	ability to install insulation and finishes
17.02.13	ability to apply materials as per drawings and specifications

Sub-task

17.03 Insulates refrigeration systems.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

17.03.01	knowledge of system operation
17.03.02	knowledge of suitable insulation materials
17.03.03	knowledge of drawings and specifications
17.03.04	knowledge of contraction of systems
17.03.05	knowledge of types of vapour barriers
17.03.06	knowledge of vapour barrier requirements
17.03.07	knowledge of types of fastening systems
17.03.08	knowledge of required hangers and saddles
17.03.09	knowledge of required sealants
17.03.10	knowledge of hazardous gases
17.03.11	ability to apply and maintain integrity of vapour barriers
17.03.12	ability to make precision cuts
17.03.13	ability to maintain integrity of insulation
17.03.14	ability to install insulation and finishes

Sub-task

17.04 Insulates boilers and hot water heating systems.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

17.04.01	knowledge of system operation
17.04.02	knowledge of drawings and specifications
17.04.03	knowledge of breeching

Supporting Knowledge & Abilities

17.04.04	knowledge of expansion
17.04.05	knowledge of suitable insulation materials
17.04.06	knowledge of types of hangers
17.04.07	knowledge of types of anchors and guides
17.04.08	ability to insulate for personal protection
17.04.09	ability to apply materials as per drawings and specifications

Task 18 **Insulates HVAC (heating, ventilation, and air conditioning) systems.**

Related Components: Duct work, plenums, fan housings.
Materials: Fiberglass, styrofoam, elastomeric foams, urethane, corner bead, canvas, lagging, mastic, aluminium, fiberglass cloth, stainless steel, tape, mineral wool, adhesives, pins, washers, wire, chicken wire.

Tools and Equipment: Standard tool kit, pin gun, stud gun.

Sub-task

18.01 Insulates fresh air and exhaust ducts.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

18.01.01	knowledge of system operation
18.01.02	knowledge of drawing and specifications
18.01.03	knowledge of vapour barriers
18.01.04	knowledge of fastening systems and installation methods

Supporting Knowledge & Abilities

18.01.05	knowledge of types of hangers
18.01.06	knowledge of insulation methods for hangers
18.01.07	knowledge of required fastening tools
18.01.08	ability to use and maintain fastening equipment
18.01.09	ability to apply and maintain integrity of vapour barriers
18.01.10	ability to install insulation and finishes

Sub-task

18.02 Insulates supply and return air ducts.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

18.02.01	knowledge of drawing and specifications
18.02.02	knowledge of suitable insulation materials
18.02.03	knowledge of system operation
18.02.04	knowledge of insulation methods for hangers
18.02.05	knowledge of hangers
18.02.06	knowledge of types of vapour barriers
18.02.07	knowledge of vapour barrier requirements
18.02.08	knowledge of types of fastening tools
18.02.09	knowledge of fastening systems
18.02.10	ability to use and maintain fastening equipment
18.02.11	ability to apply and maintain integrity of vapour barriers

Supporting Knowledge & Abilities

18.02.12	ability to identify supply and return air ducts
18.02.13	ability to install insulation and finishes
18.02.14	ability to apply materials as per drawings and specifications

Sub-task

18.03 Insulates plenums.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

18.03.01	knowledge of drawing and specifications
18.03.02	knowledge of system operation
18.03.03	knowledge of suitable insulation materials
18.03.04	knowledge of insulation methods for hangers
18.03.05	knowledge of types of hangers
18.03.06	knowledge of types of vapour barriers
18.03.07	knowledge of vapour barriers requirements
18.03.08	knowledge of required fastening tools
18.03.09	knowledge of fastening systems
18.03.10	ability to use and maintain fastening equipment
18.03.11	ability to apply and maintain integrity of vapour barriers
18.03.12	ability to install insulation and finishes

Sub-task

18.04 Installs insulation for acoustic.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

18.04.01	knowledge of potential safety hazards
18.04.02	knowledge of types of insulation materials
18.04.03	knowledge of types of fastening systems
18.04.04	knowledge of types of adhesives and application methods
18.04.05	knowledge of spray methods for adhesives
18.04.06	ability to work in confined space
18.04.07	ability to maintain integrity of coatings
18.04.08	ability to install insulation and finishes
18.04.09	ability to apply materials as per plans and specifications

Task 19 Insulates fittings.

Related Components: Tanks, elbows, valves, unions, tees, reducers, flanges, instrumentation, hangers, expansion joints.
Materials: Fiberglass, styrofoam, cement, foam glass, elastomeric foam, wire, urethane, adhesives, tape, mineral wool, bands.

Tools and Equipment: Standard tool kit, mitre saw, band saw, mitre chart, sprayer, foam gun.

Sub-task

19.01 Develops layout for fittings.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

19.01.01	knowledge of geometry and basic mathematics
19.01.02	knowledge of required measurements
19.01.03	knowledge of layout requirements
19.01.04	knowledge of function of fittings
19.01.05	ability to take accurate measurements
19.01.06	ability to develop layout patterns for material and jacketing
19.01.07	ability to use measurement tools
19.01.08	ability to incorporate insulation thickness into layout calculations

Sub-task

19.02 Applies adhesives or fastening systems.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

19.02.01	knowledge of types of adhesives
19.02.02	knowledge of adhesive application procedures
19.02.03	knowledge of expansion/contraction springs
19.02.04	knowledge of fastening systems
19.02.05	knowledge of installation procedures of fastening systems

Supporting Knowledge & Abilities

19.02.06	knowledge of safety procedures
19.02.07	ability to comply with safety procedures

Sub-task

19.03 Installs fabricated insulation fittings.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

19.03.01	knowledge of geometry and basic mathematics
19.03.02	knowledge of fastening systems
19.03.03	knowledge of required tools
19.03.04	knowledge of types of cement
19.03.05	knowledge of plans and specifications
19.03.06	ability to install cement
19.03.07	ability to layout and cut mitres
19.03.08	ability to use required tools

Task 20 Installs finishing materials.

Related Components: Piping, duct work, boilers, chillers, hangers, fittings, pumps, valves, vessels, tanks.
Materials: Canvas, PVC, aluminum, stainless steel, fiberglass, cheese cloth, cement, tapes, glass fab, mastics, adhesives, lagging adhesives, staples, bandings, wheat paste, screws, tacks, vapour barriers, all service jacketing, RFFRK jacketing (Reinforced Foiled Flame Retardant Kraft).

Tools and Equipment: Standard tool kit, beader, crimper, lock former, easy edger, staple gun, shears, forming roller, notchers, metal brake, electric shears, stud welder, electric drill, rivet gun, band tightener, combination machine.

Note: Wheat paste is not permitted in Ontario.

Sub-task

20.01 Fabricates finishing materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

20.01.01	knowledge of mathematics and geometry
20.01.02	knowledge of pattern development
20.01.03	knowledge of finishing materials
20.01.04	knowledge of lap seams and safety edges
20.01.05	ability to take proper measurements
20.01.06	ability to use fabricating tools and equipment
20.01.07	ability to build and install appropriate seals into system
20.01.08	ability to develop water sheds
20.01.09	ability to apply various finishing materials

Sub-task

20.02 Installs fastening systems.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

20.02.01	knowledge of fastening systems including pin and stud welders
20.02.02	knowledge of types of adhesives
20.02.03	ability to properly install banding and seals
20.02.04	ability to operate pin and stud welders

Task 21 **Insulates for sound proofing.**

Related Components: Walls, ceilings, sound room, air space.
Materials: Canvas, PVC, aluminum, stainless steel, fiberglass, cheese cloth, acoustic lining, styrofoam, cork, lead, fiberglass, barymat.

Tools and Equipment: Stud gun, standard tool kit, power actuated tools.

Sub-task

21.01 Hangs acoustic panels.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

21.01.01	knowledge of support systems
21.01.02	knowledge of insulating materials
21.01.03	knowledge of fastening system
21.01.04	ability to install support systems

Sub-task

21.02 Installs acoustic panels to ceilings and walls.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

21.02.01	knowledge of fastening systems
21.02.02	knowledge of support systems
21.02.03	knowledge of insulating materials
21.02.04	ability to install support systems
21.02.05	ability to fabricate ceiling and wall acoustic panels

BLOCK D

ASBESTOS ABATEMENT

Trends: *Continued enforcement of regulations; and, a greater awareness of the hazards of asbestos.*

Task 22 **Determines scope of work.** (unique to this area of the trade)

Related Components: None identified.
Materials: Flash light, sample bottles, sealants.

Tools and Equipment: Personal protective equipment (PPE), knife, scraper, aviation snips.

Sub-task

22.01 Retrieves sample of asbestos for testing.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

22.01.01 knowledge of regulations and proper procedures for retrieving sample

22.01.02 knowledge of testing facilities

22.01.03 ability to safely retrieve sample

22.01.04 ability to tag sample

Sub-task

22.02 Determines the applicable rules and regulations.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

22.02.01 knowledge of provincial rules and regulations

22.02.02 ability to contact regulatory bodies

22.02.03 ability to contact independent monitoring

Sub-task

22.03 Determines required personal protective equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

22.03.01 knowledge of job requirements

Supporting Knowledge & Abilities

22.03.02	knowledge of risk factors
22.03.03	knowledge of safe work practices and procedures
22.03.04	knowledge of regulatory classifications applicable to volume of material
22.03.05	knowledge of types of PPE
22.03.06	ability to properly fit, clean and maintain PPE

Sub-task

22.04 Determines disposal methods and requirements.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

22.04.01	knowledge of governmental rules and regulations
22.04.02	knowledge of disposal requirements
22.04.03	ability to coordinate disposal

Task 23 Removes asbestos in high risk conditions.

Related Components: Asbestos contaminated substrates.
Materials: Polyurethane sheeting, spray glue, lumber, duct tape, staples, disposal bags and ties, encapsulants, lock down material, amending agents, soap, shampoo.

Tools and Equipment: Standard tool kit, water hoses, showers, scrapers, negative air machine, respirator, drain plugs, temporary lighting, extension cords, HEPA Vacuum cleaner, scaffolding, ground fault panel, airless spray equipment, personal protective equipment (PPE), aviation snips, nippers, rubber boots, shovel, disposal bin.

Sub-task

23.01 Builds enclosure.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	no	NV	yes	yes	ND	yes	yes	yes	NV	NV

23.01.01	knowledge of required materials
23.01.02	knowledge of personnel and material decontamination facilities
23.01.03	knowledge of construction techniques
23.01.04	ability to plan required enclosure
23.01.05	ability to build and maintain decontamination facilities
23.01.06	ability to construct required enclosure
23.01.07	ability to determine number of negative air units required based on size of enclosure built

Sub-task

23.02 Prepares site for removal of asbestos.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	no	NV	yes	yes	ND	yes	yes	yes	NV	NV

23.02.01	knowledge of required tools and equipment
23.02.02	knowledge of proper location of hazardous materials signs
23.02.03	ability to use and maintain required safety and protective equipment
23.02.04	ability to obtain required equipment
23.02.05	ability to secure area
23.02.06	ability to notify appropriate personnel

Sub-task

23.03 Removes asbestos.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	no	NV	yes	yes	ND	yes	yes	yes	NV	NV

23.03.01	knowledge of proper removal techniques
23.03.02	knowledge of requirements to use water
23.03.03	knowledge of decontamination procedures
23.03.04	knowledge of specialized equipment
23.03.05	knowledge of enclosure dismantling procedures
23.03.06	knowledge of disposal procedures of enclosure
23.03.07	knowledge of required negative air pressure
23.03.08	ability to carry out various asbestos removal techniques
23.03.09	ability to maintain required negative air pressure
23.03.10	ability to work with safety gear on
23.03.11	ability to apply lock-down sealant (encapsulant) to enclosure
23.03.12	ability to clean up site after removal (re-establish site)

Sub-task

23.04 Disposes of asbestos materials.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	no	NV	yes	yes	ND	yes	yes	yes	NV	NV

23.04.01	knowledge of rules and regulations relating to disposal of asbestos materials

Supporting Knowledge & Abilities

23.04.02	ability to obtain manifest
23.04.03	ability to obtain permit
23.04.04	ability to locate approved disposal site
23.04.05	ability to package asbestos materials as per regulations
23.04.06	ability to transport material to approved site

Task 24 **Performs maintenance repair.**

Related Components: Any substrate insulated with asbestos materials.
Materials: Sealants, disposal bags, tape, canvas, aluminum, mastics, lagging adhesive, amended water.

Tools and Equipment: Standard tool kit, HEPA (High Efficiency Particulate Absolute) vacuum, glove bag, scraper, wire brush, pump sprayer, hammer, chisel, personal protective equipment (PPE), aviation snips.

Sub-task

24.01 Identifies scope of work.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

24.01.01	knowledge of governmental rules and regulations
24.01.02	knowledge of work specifications
24.01.03	ability to interpret governmental rules and regulations
24.01.04	ability to develop/maintain maintenance program/journal

Sub-task

24.02 Determines method of repair.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

24.02.01 knowledge of governmental rules and regulations

24.02.02 ability to safely remove asbestos using glove bags

24.02.03 ability to apply regulations to removal of asbestos

Task 25 Encloses asbestos.

Related Components: Any asbestos contaminated substrates.
Materials: Dry wall, corner bead, caulking, plywood, screws, metal cladding, lumber (tongue and groove), plaster.

Tools and Equipment: Power actuated tools, standard tool kit, drills, skill saw, personal protective equipment (PPE).

Sub-task

25.01 Determines scope of work.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

25.01.01 knowledge of required precautions

25.01.02 ability to determine building and sealing method for (enclosure) containing and encapsulating asbestos

Sub-task

25.02 Builds asbestos enclosure. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

25.02.01 knowledge of required materials

25.02.02 ability to ensure enclosure is structurally sound and air tight

Task 26 Encapsulates asbestos.

Related Components: Any asbestos contaminated substrates.
Materials: Encapsulants (bridging and penetrating).

Tools and Equipment: Airless sprayer, standard tool kit, personal protective equipment (PPE) including respirator.

Sub-task

26.01 Determines scope of work. **Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

26.01.01 knowledge of safety regulations

26.01.02 knowledge of governmental rules and regulations

26.01.03 ability to conduct visual inspection

26.01.04 ability to determine severity of condition

Sub-task

26.02	**Sprays bridging or penetrating encapsulant.**	**Supporting Knowledge & Abilities**

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

26.02.01	knowledge of governmental rules and regulations
26.02.02	knowledge of types of materials
26.02.03	knowledge of safety procedures
26.02.04	knowledge of types of spraying equipment
26.02.05	ability to operate spraying equipment

BLOCK E

SPRAYING INSULATION MATERIALS

Trends: *Has become a specialized field in most jurisdictions.*

Task 27 **Sprays insulations.**

Related Components: Turbines, tanks, refrigerator, structural steel, decking, piping, bulk heads, vessels, duct, breechings, parkades.
Materials: Mineral fibre, ceramic fibre, calcium, urethane, polyethylene, cement, polystyrene, styrofoam, styrospan, fiberglass, cellulose, chicken wire, speed clips, fasteners, abrasives.

Tools and Equipment: Spray pumps, airless sprayer, trowels, mixers, pin gun, stud welder, lacing hook/needle, thickness gauge, thermometer, standard tool kit, grinders, wire brushes, sand paper.

Sub-task

27.01 Determines materials and equipment required.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

27.01.01	knowledge of types of spraying materials
27.01.02	knowledge of materials properties
27.01.03	knowledge of appropriate consistency of mixture
27.01.04	knowledge of purpose of application
27.01.05	knowledge of required personal protective equipment such as respirators, gloves and goggles
27.01.06	knowledge of potential hazards such as toxic fumes, sources of ignition
27.01.07	ability to interpret data sheets and specifications
27.01.08	ability to work in confined spaces
27.01.09	ability to insulate according to plans and specifications

Sub-task

27.02 Prepares substrate.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

27.02.01	knowledge of types required fasteners
27.02.02	knowledge of temperature requirements of substrate
27.02.03	knowledge of required tools

Supporting Knowledge & Abilities

27.02.04	knowledge of site specific limitations
27.02.05	knowledge of substrate coating
27.02.06	knowledge of primers and their properties
27.02.07	knowledge of substrate condition
27.02.08	ability to correct substrate irregularities
27.02.09	ability to prime substrate

Sub-task

27.03 Protects surrounding work area.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

Supporting Knowledge & Abilities

27.03.01	knowledge of types of protective equipment
27.03.02	knowledge of required ventilation
27.03.03	ability to protect equipment

Sub-task

27.04 Applies fastening systems.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

Supporting Knowledge & Abilities

27.04.01	knowledge of types of fasteners
27.04.02	knowledge of abrasion techniques
27.04.03	knowledge of proper application of reinforcements such as chicken wire, road mesh, glass fabric, metal lathe

Supporting Knowledge & Abilities

27.04.04	knowledge of safety regulations
27.04.05	ability to use pin welder and stud welder
27.04.06	ability to install reinforcements according to specifications
27.04.07	ability to layout grid pattern
27.04.08	ability to operate abrasion equipment

Sub-task

27.05 Prepares material and equipment.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

Supporting Knowledge & Abilities

27.05.01	knowledge of mixing procedures
27.05.02	knowledge of temperature ranges
27.05.03	knowledge of ratios, consistencies and cure times
27.05.04	knowledge of set up procedures
27.05.05	knowledge of expansions rates
27.05.06	ability to set-up equipment
27.05.07	ability to mix materials according to manufacturers' instructions

Sub-task

27.06 Applies spray at pre-determined thickness and specifications.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

27.06.01	knowledge of spraying techniques
27.06.02	knowledge of specifications
27.06.03	knowledge of multi-layer applications
27.06.04	knowledge of types of spraying equipment
27.06.05	ability to measure thickness
27.06.06	ability to use spraying equipment
27.06.07	ability to trowel or tamp

Sub-task

27.07 Tamps materials to required density using a tamping tool.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	no	yes	NV	NV

27.07.01	knowledge of required density, consistency and thickness
27.07.02	knowledge of tamping techniques
27.07.03	knowledge of required equipment
27.07.04	ability to maintain consistency
27.07.05	ability to visually inspect for consistency of thickness

Task 28 **Sprays sealers and coatings.**

Related Components: Beams, turbines, tanks, refrigerator, structural steel, decking, piping, bulk heads, vessels, duct, parkades.
Materials: Mastics, adhesives, laggings, cements, encapsulant, sealants, fire retardants, primers, finishes.

Tools and Equipment: Spray pumps, airless sprayer, trowels, mixers, pin gun, stud welder, lacing hook/needle, thickness gauge, thermometer, standard tool kit, grinders, wire brushes, sand paper.

Note: In some jurisdictions this task is limited to spraying adhesives and encapsulant.

Sub-task

28.01 Prepares materials and equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

28.01.01 knowledge of types of materials such as mastics, adhesives, and cement

28.01.02 knowledge of purpose of application

28.01.03 knowledge of properties and hazards of materials

28.01.04 knowledge of required spraying equipment

28.01.05 ability to select appropriate reinforcements

28.01.06 ability to prepare materials and equipment according to specifications and manufacturers' specifications

Sub-task

28.02 Prepares insulated substrate.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

28.02.01	knowledge of required reinforcements
28.02.02	knowledge of bridging agents
28.02.03	knowledge of required vapour barriers
28.02.04	ability to apply reinforcement materials
28.02.05	ability to apply vapour barriers

Sub-task

28.03 Prepares un-insulated substrate.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

28.03.01	knowledge of types of coatings
28.03.02	knowledge of cleaning agents
28.03.03	ability to select appropriate coating
28.03.04	ability to apply abrasive coatings
28.03.05	ability to clean surface

Sub-task

28.04 Protects work area.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

28.04.01	knowledge of requirements for protecting work area
28.04.02	knowledge of types of protective equipment
28.04.03	ability to practice good housekeeping

Sub-task

28.05 Applies spray as per specifications.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

28.05.01 knowledge of required thickness and consistencies

28.05.02 knowledge of mixing procedures

28.05.03 knowledge of material properties such as shrinkage and drying time

28.05.04 ability to use mil thickness gauge

28.05.05 ability to use spraying equipment

Task 29 Maintains spray equipment.

Related Components: Spray pumps, hoses, nozzles, pressure fed sprayer, airless sprayer.
Materials: Cleaning agents, solvents.

Tools and Equipment: Standard tool kit, manufacturers' tools, tip cleaners, personal protective equipment (PPE).

Sub-task

29.01 Flushes/rinses equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

29.01.01 knowledge of appropriate cleaning/flushing agents

Supporting Knowledge & Abilities

29.01.02	knowledge of manufacturers' recommendations regarding cleaning of equipment
29.01.03	ability to acquire data from data sheet/label

Sub-task

29.02 Disassembles equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

29.02.01	knowledge of disassembly procedures
29.02.02	knowledge of required tools
29.02.03	knowledge of proper lifting techniques
29.02.04	ability to keep track of parts

Sub-task

29.03 Cleans equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

29.03.01	knowledge of parts requiring cleaning
29.03.02	knowledge of cleaning agents
29.03.03	knowledge of cleaning techniques
29.03.04	knowledge of manufacturers' recommendations
29.03.05	ability to remove and dispose of all residue

Sub-task

29.04 Re-assembles equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

29.04.01	knowledge of re-assembly procedures
29.04.02	knowledge of plans and specifications
29.04.03	ability to visually check condition of equipment after cleaning
29.04.04	ability to conduct operational check of equipment

Sub-task

29.05 Stores equipment.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

29.05.01	knowledge of storage procedures
29.05.02	knowledge of storage area conditions (hot, cold, wet)
29.05.03	ability to take appropriate care of hoses and nozzles

BLOCK F

FIRE STOPPING AND SMOKE SEALS

Trends: *Increase in enforcement of regulations; improved developments in materials; greater recognition by industry; and, more technical.*

Task 30 **Determines required fire stopping system.**

Related Components: Walls, floors, ceilings, bulk heads, deck heads, roof, ventilation shafts, access shafts.
Materials: Manufacturers' specifications, UL document.

Tools and Equipment: Flashlight, drawings, specifications.

Sub-task

30.01 Conducts site visit.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

Supporting Knowledge & Abilities

30.01.01	knowledge of mechanical and electrical systems
30.01.02	knowledge of UL (Underwriters Laboratories Inc.) approved systems
30.01.03	knowledge of fire stopping systems
30.01.04	knowledge of architectural, mechanical and electrical drawings
30.01.05	knowledge of piping materials
30.01.06	knowledge of plans, specifications and building codes
30.01.07	knowledge of applicable fire codes
30.01.08	ability to conduct visual inspection
30.01.09	ability to locate and inspect fire barriers and walls

Sub-task

30.02 Consults manufacturers' manuals and specifications.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

30.02.01 knowledge of types of manufacturers' manuals

30.02.02 ability to interpret manufacturers' specifications

Task 31 Installs fire stopping.

Related Components: Penetration through walls, floors, roof, expansion joints, curtain wall.
Materials: Intumescents, wrap strips, caulking, mineral wool, cement, restricting collars, banding, foams, composite sheets, fasteners, washers, screws, metal strips, PPD (plastic pipe devices), liquid soap, caulking cement.

Tools and Equipment: Sprayers, standard tool kit, banding tools, caulking gun, drills.

Sub-task

31.01 Prepares site.

Supporting Knowledge & Abilities

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	yes	yes	yes	NV	NV

31.01.01 knowledge of size and type of cavity to fill

31.01.02 knowledge of annular space

31.01.03 knowledge of UL approved systems

31.01.04 ability to take proper measurements

31.01.05 ability to identify manufactured system

31.01.06 ability to follow manufacturers' instructions

Supporting Knowledge & Abilities

31.01.07	ability to fill cavity according to size, shape
31.01.08	ability to install materials in accordance with manufacturers' specifications or building codes

Sub-task

31.02 Assesses need for sealing of perforations.

NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK
yes	yes	yes	NV	yes	yes	ND	no	yes	yes	NV	NV

Supporting Knowledge & Abilities

31.02.01	knowledge of materials
31.02.02	knowledge of penetrating items through fire barriers
31.02.03	knowledge of building expansion joints
31.02.04	knowledge of mechanical and electrical ventilation systems
31.02.05	knowledge of fire walls, curtain walls, fire stops and smoke seals
31.02.06	ability to determine perforations requiring fire stops

APPENDICES

TOOLS AND EQUIPMENT

airless sprayer
anchors
band saw
band tightener
banding tools
beader
blow torch
brake
calculator
caulking gun
chisel
combination machine
crimper
drain plugs
drills
earth moving equipment
easy edger
electric drill
electric shears
extension cords
flare staple gun
foam gun
glove bag
grinders
hammer
HEPA (High Efficiency Particulate Absolute) vacuum
hog ringer
knife
lacing hook/needle
lock former
manufacturers' tools
metal brake
mitre chart
mitre saw
mixers
negative air machine
notchers
personal protective equipment
pin gun
pneumatic tools
power actuated tools
pump sprayer
rake
respirator
rivet gun
rollers
rubber
sand paper
scale ruler
scraper
sewing machine
shears
shovel
showers
skill saw
sprayer
spray pumps
spraying equipment
springs and bands
staple gun
strapping tools
stud gun
stud welder
tamper
tape measure
thermometer
thickness gauge
tip cleaners
trowels
t-square
water hoses
wire brush

Standard Tool Kit

carpenter's square
chicken wire hook
dividers
end nippers
hammer
knives
paint brush
paste brush
pliers
pointer and gauging trowels
ruler
saws (keyhole and hand)
scissors
scratch all
screwdrivers
slicks
springs or bands
staple gun
tape measure
tin snips

ABBREVIATIONS

CCDA	Canadian Council of Directors of Apprenticeship
EHT	Electrical Heat Tracing
HEPA	High Efficiency Particulate Absolute
HRDC	Human Resources Development Canada
HVAC	Heating, Ventilation, and Air Conditioning
MSDS	Material Safety Data Sheets
PPD	Plastic Pipe Devices
PPE	Personal Protective Equipment
RFFRK	Reinforced Foiled Flame Retardant Kraft

BLOCKS AND TASKS WEIGHTING

BLOCK A OCCUPATIONAL SKILLS

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	National Average
%	20	14	5	NV	5	12	ND	10	20	20	NV	NV	13%

Task 1 Determines administrative requirements.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	17	21	5	NV	40	25	ND	10	20	15	NV	NV	19%

Task 2 Determines production requirements.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	30	31	5	NV	40	25	ND	10	30	15	NV	NV	23%

Task 3 Determines site specific requirements.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	20	22	50	NV	10	25	ND	5	30	25	NV	NV	23%

Task 4 Checks substrate for readiness.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	20	19	5	NV	5	20	ND	45	10	25	NV	NV	19%

Task 5 Cleans up site after jobs.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	13	7	35	NV	5	5	ND	30	10	20	NV	NV	16%

BLOCK B INDUSTRIAL APPLICATION

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	National Average
%	32	32	48	NV	40	35	ND	30	45	25	NV	NV	36%

Task 6 Insulates for thermal applications.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	21	21	20	NV	20	25	ND	15	15	20	NV	NV	20%

Task 7 Fabricates insulation for tanks, vessels and fittings.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	23	17	25	NV	10	20	ND	20	15	15	NV	NV	18%

Task 8 Fabricates removable covers.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	10	8	10	NV	5	10	ND	15	5	5	NV	NV	9%

Task 9 Installs protective coverings.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	10	10	20	NV	25	10	ND	15	20	15	NV	NV	16%

Task 10 Applies sealants.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	7	7	4	NV	3	5	ND	10	5	10	NV	NV	6%

Task 11 Insulates for refractory applications. (1500° F +)

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	7	6	4	NV	15	10	ND	5	5	5	NV	NV	7%

Task 12 Insulates for cryogenic applications. (-150° F to absolute zero)

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	0	9	4	NV	15	10	ND	5	20	5	NV	NV	8%

Task 13 Installs underground insulating systems.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	8	8	4	NV	2	5	ND	5	5	5	NV	NV	5%

Task 14 Insulates for sound proofing.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	6	8	4	NV	2	3	ND	5	5	5	NV	NV	5%

Task 15 Applies fire proofing materials.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	8	6	5	NV	3	2	ND	5	5	15	NV	NV	6%

BLOCK C COMMERCIAL APPLICATION

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	National Average
%	25	32	40	NV	40	30	ND	20	20	25	NV	NV	29%

Task 16 Insulates plumbing systems.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	23	18	15	NV	20	20	ND	20	15	15	NV	NV	18%

Task 17 Insulates mechanical systems.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	20	23	20	NV	30	25	ND	20	20	20	NV	NV	22%

Task 18 Insulates HVAC (heating, ventilation, and air conditioning) systems.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	20	19	20	NV	25	17	ND	15	20	20	NV	NV	20%

Task 19 Insulates fittings.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	10	16	20	NV	5	20	ND	15	20	15	NV	NV	15%

Task 20 Installs finishing materials.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	14	17	20	NV	15	15	ND	15	20	20	NV	NV	17%

Task 21 Insulates for sound proofing.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	13	7	5	NV	5	3	ND	15	5	10	NV	NV	8%

BLOCK D ASBESTOS ABATEMENT

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	National Average
%	10	8	2	NV	10	15	ND	20	10	10	NV	NV	11%

Task 22 Determines scope of work. (unique to this area of the trade)

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	23	22	10	NV	10	25	ND	5	20	30	NV	NV	18%

Task 23 Removes asbestos in high risk conditions.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	23	21	0	NV	60	30	ND	50	60	20	NV	NV	33%

Task 24 Performs maintenance repair.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	17	21	5	NV	10	25	ND	15	5	20	NV	NV	15%

Task 25 Encloses asbestos.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	17	17	5	NV	5	5	ND	15	10	15	NV	NV	11%

Task 26 Encapsulates asbestos.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	20	19	80	NV	15	15	ND	15	5	15	NV	NV	23%

BLOCK E SPRAYING INSULATION MATERIALS

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	National Average
%	7	5	1	NV	2	3	ND	10	2	10	NV	NV	5%

Task 27 Sprays insulations.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	30	44	90	NV	50	50	ND	35	0	40	NV	NV	42%

Task 28 Sprays sealers and coatings.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	20	29	5	NV	30	30	ND	35	50	30	NV	NV	29%

Task 29 Maintains spray equipment.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	50	27	5	NV	20	20	ND	30	50	30	NV	NV	29%

BLOCK F FIRE STOPPING AND SMOKE SEALS

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	National Average
%	6	9	4	NV	3	5	ND	10	3	10	NV	NV	6%

Task 30 Determines required fire stopping system.

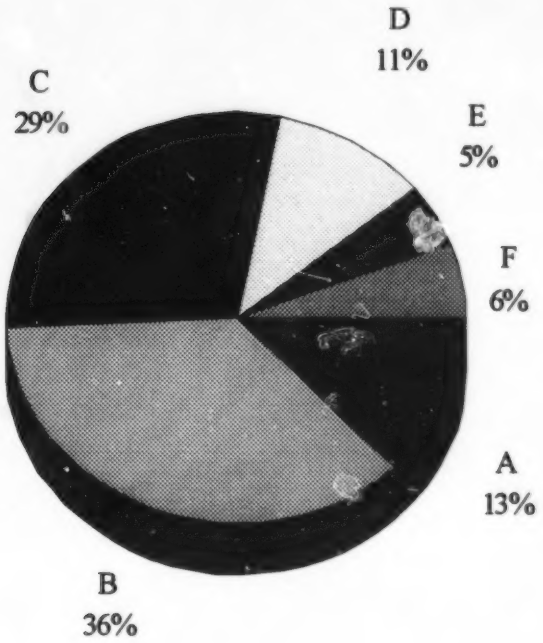
	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	33	32	50	NV	30	50	ND	10	50	35	NV	NV	36%

Task 31 Installs fire stopping.

	NF	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YK	
%	67	68	50	NV	70	50	ND	90	50	65	NV	NV	64%

PIE CHART*

Insulator (Heat and Frost)



TITLES OF BLOCKS

Block A	Occupational Skills	Block D	Asbestos Abatement
Block B	Industrial Application	Block E	Spraying Insulation Materials
Block C	Commercial Application	Block F	Fire Stopping and Smoke Seals

* The average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from one hundred up to one hundred and fifty multiple choice questions on each examination.

INSULATOR (HEAT AND FROST) (2000)

APPENDIX "E"

BLOCKS	TASKS	SUB-TASKS
A **Occupational Skills**	**1.** Determines administrative requirements.	1.01 Interprets specifications and drawings.
		1.02 Sets work schedules.
		1.03 Determines labour requirements.
		1.04 Completes documents and records as required.
		1.05 Calculates required quantities of materials.
		1.06 Orders materials.
	2. Determines production requirements.	2.01 Determines required tools and equipment.
		2.02 Erects scaffolding.
		2.03 Arranges for pre-fabrication of materials.
	3. Determines site specific requirements.	3.01 Determines required orientation programs.
		3.02 Determines required safety training.
		3.03 Determines site specific access hours and location.
		3.04 Identifies required approvals.
		3.05 Obtains required permits.
		3.06 Determines required work facilities.
	4. Checks substrate for readiness.	4.01 Accesses substrate.
		4.02 Inspects substrate.
		4.03 Checks for release and approvals.
	5. Cleans up site after jobs.	5.01 Disposes of materials.
		5.02 Inspects site.
B **Industrial Application**	**6.** Insulates for thermal applications.	6.01 Insulates for hot applications. (213 to 1500 ° F)
		6.02 Insulates for moderate applications. (70 to 212° F)
		6.03 Insulates for cold applications. (30 to 69° F)
		6.04 Insulates for low temperature applications. (-149 to -29° F)
		6.05 Insulates for cryogenic systems. (-150 to - 459° F)
		6.06 Applies insulation over steam and electrical traced systems.
	7. Fabricates insulation for tanks, vessels and fittings.	7.01 Takes required measurements.
		7.02 Lays out materials for fittings.
		7.03 Applies adhesives or fastening systems.
		7.04 Installs fabricated insulation fittings.
	8. Fabricates removable covers.	8.01 Takes required measurements.
		8.02 Develops layout.
		8.03 Assembles materials.
	9. Installs protective coverings.	9.01 Fabricates finishing materials.
		9.02 Installs fastening systems.
	10. Applies sealants.	10.01 Determines application of sealants.
		10.02 Installs reinforcements.

INSULATOR (HEAT AND FROST) (2000)

BLOCKS	TASKS	SUB-TASKS			
	11. Insulates for refractory applications. (1500 ° F +)	11.01 Selects proper insulation system (reflective, castables and cavity).	11.02 Applies insulation materials.		
	12. Insulates for cryogenic applications. (-150° F to absolute zero)	12.01 Prepares substrate.	12.02 Applies insulation materials.	12.03 Applies vapour barriers.	
	13. Installs underground insulating systems.	13.01 Builds forms for trenches.	13.02 Determines installation system or method.	13.03 Applies insulation.	13.04 Applies appropriate backfill.
	14. Insulates for sound proofing.	14.01 Insulates natural gas piping.	14.02 Insulates steam piping.	14.03 Insulates turbine systems.	
	15. Applies fire proofing materials.	15.01 Fireproofs kitchen exhaust ducts.	15.02 Fireproofs electrical trays and conduits.	15.03 Fireproofs structural components.	
C	**Commercial Application**				
	16. Insulates plumbing systems.	16.01 Insulates domestic hot water systems.	16.02 Insulates domestic cold water systems.	16.03 Insulates rain or storm water systems and vents.	
	17. Insulates mechanical systems.	17.01 Insulates steam and condensate systems.	17.02 Insulates chiller and chilled water systems.	17.03 Insulates refrigeration systems.	17.04 Insulates boilers and hot water heating systems.
	18. Insulates HVAC (heating, ventilation, and air conditioning) systems.	18.01 Insulates fresh air and exhaust ducts.	18.02 Insulates supply and return air ducts.	18.03 Insulates plenums.	18.04 Installs insulation for acoustic.
	19. Insulates fittings.	19.01 Develops layout for fittings.	19.02 Applies adhesives or fastening systems.	19.03 Installs fabricated insulation fittings.	
	20. Installs finishing materials.	20.01 Fabricates finishing materials.	20.02 Installs fastening systems.		

INSULATOR (HEAT AND FROST) (2000)

BLOCKS	TASKS	SUB-TASKS						
	21. Insulates for sound proofing.	21.01 Hangs acoustic panels.	21.02 Installs acoustic panels to ceilings and walls.					
D **Asbestos Abatement**	**22.** Determines scope of work. (unique to this area of the trade)	22.01 Retrieves sample of asbestos for testing.	22.02 Determines the applicable rules and regulations.	22.03 Determines required personal protective equipment.	22.04 Determines disposal methods and requirements.			
	23. Removes asbestos in high risk conditions.	23.01 Builds enclosure.	23.02 Prepares site for removal of asbestos.	23.03 Removes asbestos.	23.04 Disposes of asbestos materials.			
	24. Performs maintenance repair.	24.01 Identifies scope of work.	24.02 Determines method of repair.					
	25. Encloses asbestos.	25.01 Determines scope of work.	25.02 Builds asbestos enclosure.					
	26. Encapsulates asbestos.	26.01 Determines scope of work.	26.02 Sprays bridging or penetrating encapsulant.					
E **Spraying Insulation Materials**	**27.** Sprays insulations.	27.01 Determines materials and equipment required.	27.02 Prepares substrate.	27.03 Protects surrounding work area.	27.04 Applies fastening systems.	27.05 Prepares material and equipment.	27.06 Applies spray at pre-determined thickness and specifications.	27.07 Tamps materials to required density using a tamping tool.
	28. Sprays sealers and coatings.	28.01 Prepares materials and equipment.	28.02 Prepares insulated substrate.	28.03 Prepares un-insulated substrate.	28.04 Protects work area.	28.05 Applies spray as per specifications.		
	29. Maintains spray equipment.	29.01 Flushes/rinses equipment.	29.02 Disassembles equipment.	29.03 Cleans equipment.	29.04 Re-assembles equipment.	29.05 Stores equipment.		
F **Fire Stopping and Smoke Seals**	**30.** Determines required fire stopping system.	30.01 Conducts site visit.	30.02 Consults manufacturers' manuals and specifications.					

INSULATOR (HEAT AND FROST) (2000)

BLOCKS	TASKS	SUB-TASKS	
	31. Installs fire stopping.	31.01 Prepares site.	31.02 Assesses need for sealing of perforations.